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The Real Cause of the Fishy Taste of Boston Water.

When we first noticed the Report of the Superintendent of the Boston Water Board respecting the fishy taste of the water in that city, on page 109, this Vol. SCIENTIFIC AMERICAN, Prof. Horsford, of Harvard University, and Dr. Jackson, of Boston—both distinguished chemists—had been appointed to make examinations, analyze the water, and report on the same; we used the following language, "it may turn out that the disagreeable taste in the water has been caused by minute *animalculæ*." On page 133 we presented the substance of the reports of these distinguished chemists, both of which attributed the bad taste to vegetable matters. On page 134 we presented the opinions of Dr. Nichols, of Haverhill, Mass., who attributed it to a slime which accumulated on fish when deprived of great quantities of fresh inlet water. In the new volume of *Annual of Scientific Discovery*, just published, there is a paper by Dr. A. A. Hayes, of Boston, read by him at a late meeting of the American Academy, which proves conclusively that if Dr. Jackson and Prof. Horsford had taken the hint respecting the *animalculæ* theory, they would have been enabled to make correct reports. Dr. Hayes, with a practical eye, has discovered the true cause—the animalculæ. He says, "late in Dec., it was found that an enormous increase of animalculæ took place, the *cyclops* and *daphnia*, predominating, although the temperature of the water was below 40° Fah. When arrested by a coarse filter, these crustacea appeared to the naked eye of different colors, and were so distended as to have a gelatinous form, like broken down tissues of fish. Water freed from these had no odor, while the mass on the filter had a strong fish odor, and would impart it to other water. Oil could be abundantly obtained from the deposit, and repeated trials showed that this *was the source of the odor and taste of the water*."

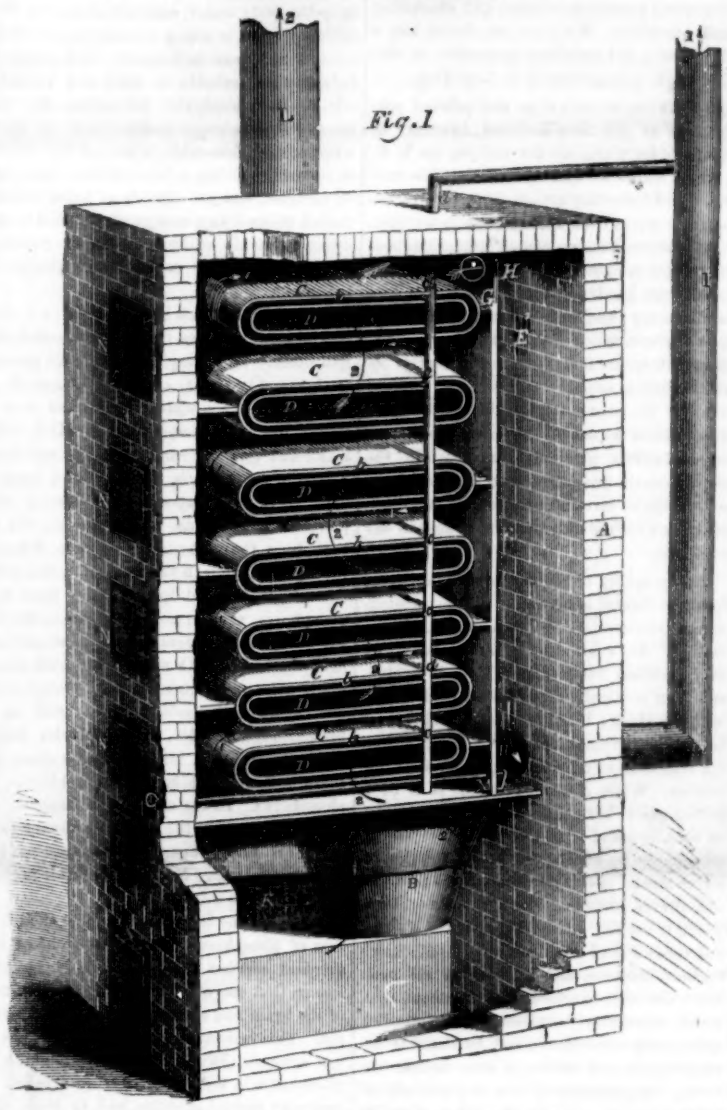
Dr. Hayes carried his results and specimens to Dr. Bacon for microscopical examination, and he pointed out two species of *cyclops* and *daphnia*, whose *bodies* seemed to be filled with oil. The paper forcibly concludes as follows:—"The general result of both chemical and microscopical examination is, that the odor, taste, and oil of the water are due exclusively to the live, dead, and decomposing animalculæ of the two species named." This is the conclusion of the whole matter.

Oil for Machinery and Illumination.

We refer our readers to the advertisement of F. S. Pease, Buffalo, N. Y., manufacturer and dealer in oil for burning, and the lubrication of machinery. For the latter purpose, the one with which we are more especially acquainted, his oil has a deservedly high reputation. On our railroads, oil forms a very large item of the annual expenditure, and it is the duty of superintendents to use the best and cheapest. Mr. Pease's oil has this character.

HOT AIR FURNACE.

Fig. 1



The annexed engraving is a perspective view of an improvement in hot air furnaces, for which a patent was granted to Abel H. Bartlett, of King's Bridge, Westchester Co., N. Y., on the 30th of January last.

A represents the casing or wall of masonry which surrounds the furnace; B is the fire chamber, and C is the flue of the fire chamber which is of serpentine form, and passes around flat horizontal chambers, D, which form the air heating chamber, the horizontal chambers, D, extending the width of the chamber or compartment which forms the flue, C, both ends of the chambers, D, communicating with the space between the side plates of the flue, C, and the masonry, A. A suitable space is left between the chambers, D, to allow the flue, C, to be of the requisite size; E is the back plate of the flue, C, or rather the upright portion of it, a space being left between the plate, E, and masonry, A, said space being a continuation of the flue, C, and having a downward draught; G are plates connected alternately to the sides of the chambers, D, and the back plate, E, and masonry, *a*, at the front of the furnace, for the purpose of causing the draft and heat from the fire chamber, B, to ascend in serpentine form, and between the chambers, D; H H are openings at the upper part of the plate, E, and I is the smoke pipe which communicates with the lower part of the space between the plate, E, and masonry, A. K is an opening at the lower part of the masonry, A, through which the cold air is admitted, and L is a pipe which communicates with one end of the uppermost chamber, D; M is a damper at the lower part of the space between the plate, E, and masonry, A. If a direct draft is required at first in order that the fire may be made quickly, the damper, M, is opened, and the draft is direct from the fire chamber, B, to the smoke pipe, I. When the damper, M, is closed, the draft and heat pass upward through the flue, C, in the direction indicated by arrows, 1, the plates, G, causing the heat to pass upward in serpentine form and horizontally between the chambers, D, the heat passes over the uppermost chamber, D, and through the openings, H, and down the space between the plate, E, and masonry, A, into the pipe, I. The cold air meanwhile passes through the opening, K, at the lower part of the masonry, A, and ascends, passing in one end of the lower chamber, D, and out at the opposite end, and ascends in serpentine form through the chambers, D, as indicated by the arrows, 2, and the air in passing through each of the chambers, D, is subjected in broad thin layers, to two broad heated surfaces of the flue, C, and when the air reaches the uppermost chamber, D, it passes in a perfectly heated state into the hot air pipe, L. Thus it will be seen that the air to be heated, and the draft and heat from the fire chamber pass upward simultaneously in their respective passages, and cross each other at right angles, the air in the chambers, D, being exposed to two heated surfaces of the flue, C, viz., above and below, and the horizontal portions of the flue, C, communicating heat to two surfaces of the chambers, D, also above and below. The cold air, therefore, that enters the opening, K, passes over a great area of heating surface in passing upward to the pipe, L.

The air-heating chambers, D, are lined, or are formed of two thicknesses of metal, so as to leave a space, *b*, around each chamber, and these spaces are connected by small horizontal pipes, *c*, to a vertical pipe, *d*, which communicates with the smoke pipe, I. By this arrangement the air, in passing through the chambers, D, is prevented from being impregnated with any deleterious gases that may escape through the pores of the iron of the flue, C, for when it has passed through the inner thickness of metal into the spaces, *b*, it will, instead of passing through the outer thickness, naturally pass through the small pipes, *c*, into the vertical pipe, *d*, and thence into the smoke pipe, I.—The heated air therefore passes into the pipe, L, in a perfectly pure state, and may be conveyed therefrom through suitable pipes to the apartments designed to be heated. The doors designated by N are merely for the purpose of enabling the flue, C, to be cleaned.

The patent embraces four claims, which will be found on the list of the above date published in our columns. This hot air furnace possesses a number of advantages. The idea of lining the flues, and carrying off the carbonic acid gas which escapes through joints, is a good one, as it provides a means of keeping the air more pure than it would be otherwise.

More information may be obtained by letter addressed to Mr. Bartlett.

Lime in Agriculture.

Prof. Johnson says, "the effects of lime are greatest when well mixed with the soil, and kept near the surface within easy reach of the atmosphere. Its value is greatest upon newly ploughed arable surface soils.—Such soils usually contain a large amount of vegetable and other organic matter, hence the rule that lime ought always to precede putrescent manure when old leas are broken up for cultivation. It produces a greater proportional improvement on poor soils in their natural state, than on such as are richer; as naturally poor soils contain a greater or less quantity of organic matter, but are nearly destitute of lime. On the other hand, on poor arable lands which have been worn out by repeated liming and cropping, it does no good whatever, as such soils, if they do not already abound in lime, are generally destitute of other kinds of food, organic and inorganic, by which healthy plants are nourished, and they can only be restored to fertility by a judicious admixture of all. On all lands in which vegetable matter is wanting, lime may even do harm to the immediate crops. A consideration of the circumstances above adverted to are sufficient to induce the entire abandonment of it. Where soil has been impoverished through its unskillful application, or by large admixtures of lime and marl for a series of years, new additions are a waste of material and labor. When natural causes have removed the superabundance, and produced an accumulation of those other substances which, when associated with lime, increase the productiveness of the soil, its use may be resumed."

Quite a discussion has been going on in the Quebec papers, respecting a substance found among the rocks near that city, which burns like sea coal. Mr. Logan, the government geologist, affirms it to be nothing but an erratic bituminous shale, while others believe it to be real coal.

The Art of Dyeing—No. 10.

GERMAN VAT—In our last we gave Dumas' method of setting and working the pastel vat, which is simply a variety of woad. The following is Dumas' account of the German vat :—

"This vat is of nearly similar dimensions to that used for woad. Its diameter is about 6½ feet, and its depth 8½ feet. Having filled the copper vat with water, we are to heat it to 200° Fah.; we then add 20 common pailsful of bran, 22 lbs. of carbonate of soda, 11 lbs. of indigo, and 5½ pounds of lime, thoroughly slaked, in powder. The mixture is to be well stirred, and then set aside for two hours; the workman should continually watch the progress of the fermentation, moderating it more or less by means of lime or carbonate of soda, so as to render the vat in a working state at the end of twelve, fifteen, or, at the most, eighteen hours. The odor is the only criterion by which the workman is enabled to judge of the good state of the vat, he must therefore possess considerable tact and experience.

In the process of dipping we introduce 84 lbs., 106 ibs., or even 130 lbs. of wool, in a net bag, similar to that in the woad vat, taking care that the bag is not allowed to rest against the sides of the copper. When the wool has sufficiently imbibed the color, we remove the bag containing it, and allow it to drain for a short time over the vessel. We operate in this way on two or three quantities in succession; we then remove the vat, and set it aside for two hours; we must be careful, from time to time, to replace the indigo absorbed by the wool, as also to add fresh quantities of bran, lime, and crystallized carbonate of soda, so as constantly to maintain the fermentation at a suitable point.

The German vat differs from the potash vat by the fact that the potash is replaced by crystallized carbonate of soda and caustic lime, which latter substance also gives to the carbonate of soda a caustic character. It presents a remarkable saving as compared to the potash vat; hence the frequency of its employment; but it requires great care, and is more difficult to manage. It also offers considerable economy of labor; one man is amply sufficient for each vat.

GERMAN WOAD VAT—The army cloth is usually dyed by means of the pastel vat, which gives the most advantageous results. We here make use of vats about 8½ feet in depth, and 5 feet in diameter, into which we introduce from 361 lbs. to 405 lbs. of pastel or of woad, after previous maceration. The vat is to be filled with boiling water, and we then add to the bath 22 lbs. of madder, 17½ lbs. of weld, and 13 lbs. of bran. The mixture is to be maintained in a state of ebullition for about half an hour; we next add a few pailsful of cold water, taking care, however, not to lower the temperature beyond 130° Fah.; during the whole of this time a workman, provided with a rake, keeps incessantly stirring the materials of the bath. The vat is then accurately closed by means of a wooden lid, and surrounded by blankets, so as to keep up the heat. It is now kept quiet for six hours; after this time it is again stirred by means of a rake, for the space of half an hour; and this operation should be repeated every three hours until the surface of the bath becomes marked with blue veins; we then add from six to eight pounds of slaked lime.

The color of the vat now boarders on a blackish-blue. We immediately add the indigo in quantity proportioned to the shade which we wish to obtain. The pastel in the foregoing mixture may last for several months; but we must renew the indigo in proportion as it becomes exhausted, at the same time adding both bran and madder. In general we employ 11 to 13 lbs. of good indigo for 100 lbs. of fine wool; 9 to 11 lbs. of good indigo for 100 lbs. of common wool; 9 to 11 lbs. of good indigo for 131 yards of cloth dyed in the piece."

Great care is necessary in the working of these vats, as indigo is dear; a careless blue-dyer will soon entail serious loss to his employers. The wool should be carefully examined before being dipped.

New Orleans Academy of Sciences.

The city of New York, which is the first in wealth and population on our continent, is behind Boston, Philadelphia, New Orleans, and young San Francisco, with respect to scientific associations. In all of the cities named there are Academies of the Sciences —associations of scientific men, who meet from time to time, and discuss questions of science. In New York there are a great number of scientific gentlemen, and it is a wonder to us that they have not organized themselves long ago into an association for presenting papers on science, and discussing such questions. We have no doubt but a very strong and excellent institution of this kind might be maintained in New York.

We have now before us the printed proceedings of the New Orleans Academy of Sciences, for which we are obliged to R. C. Kerr, in which we find much that is interesting. The following article is by Dr. Crawcour, we select from among quite a number.

ALLOTROPIC PHOSPHORUS—That various bodies possess the power of existing in two distinct forms, has long been an interesting fact in chemistry; and, in many instances, advantage has been taken of this alteration of form, inasmuch as we find that it frequently coexists with a sensible alteration of properties. If the expression may be allowed, the substance is the same, and yet different; different in this particular, that while the characteristic properties are unaltered, its solubility, in certain instances, its inflammability and action with certain re-agents are modified.

This property of bodies to exist in different forms, is termed *allotropism*, if the substances are non-crystalline; *dimorphism*, if crystalline. As examples of *allotropism*, we may mention vermillion, which, if heated, and then suddenly thrown into cold water, becomes black; if allowed to cool slowly, it retains its original color. Of *dimorphism*, the biniodide of mercury affords an apt illustration. When newly sublimed, it is of a yellow color, but changes to a bright scarlet on cooling; and it may be made to undergo this change by rubbing with the fingers, by which means the crystals are broken down and altered in form. The chromate of lead, which is usually yellow, becomes red if fused and thrown into cold water. A still more curious instance, and one which all must have observed, is afforded by arsenious acid, which, when newly sublimed, is a yellowish and transparent glass; left to itself it becomes opake and white; it is no longer vitreous, but is changed into a multitude of little crystals, and, at the same time, its density and solubility are altered. Rose, who has observed this change, states that where vitreous arsenious acid is dissolved in dilute and boiling hydrochloric acid, the solution, in cooling, deposits crystals of the opake acid, and a flash of light is emitted in the formation of each crystal. By exposing bodies to a high temperature, a still greater change is produced. Several metallic oxyds, as alumina and binoxyd of tin, often cease to be soluble in acid after being heated to redness. Berzelius states that when such bodies are exposed to a very high temperature, they suddenly glow, and become luminous; rising in temperature above that of the containing vessel from a discharge of heat. Dr. Graham believes that this change of property in bodies, results from loss of heat; that in this state they do not contain that quantity of heat, which they must have contained before, in a combined or latent form. No ponderable constituent is lost, but there is loss of heat. A change of arrangement of particles, it is true, occur at the same time, in some of these bodies, but this explanation will not apply to such bodies as alumina and binoxyd of tin. The loss of heat observed, will afford all the explanation necessary; if heat be admitted as a constituent of bodies equally essential as their ponderable elements. As the oxyd of chromium possesses more combined heat in the soluble, than in the insoluble state, the soluble may justly be viewed as the higher caloride; and the body in question may have different proportions of this, as of other constituents.

The phenomena under consideration, seem to require the admission of heat as a true constituent, which can modify the properties of bodies very considerably; otherwise a great physical law must be abandoned. No change of properties can occur without change of composition. But, if heat be once admitted as a chemical constituent of bodies, then a solution of the present difficulties may be looked for, nothing being more certain than that change in composition will account for change in properties.

The above remarks will apply very strongly to the body under consideration. In the ordinary state in which we see it, phosphorus is a soft, semi-transparent solid; highly inflammable; soluble in fixed and volatile oils, in ether, bisulphide of carbon, &c. In the new or allotropic modification, we have a red powder, insoluble in any of the above mixtures, requiring a high temperature for its ignition, and yet capable of being reconverted without any change of essential properties, (that is without losing or gaining anything,) into the common phosphorus of commerce.

The mode in which I have prepared it, differs somewhat from that recommended by Schrötter. The phosphorus, in small pieces, is thoroughly dried, and then placed in a small earthen jar, which is inverted into a larger one. The interspace is filled with white and very dry sand; the jars are then placed in a sand bath, and the sand heaped over them, and exposed to a steady and powerful heat for an hour. At the end of that time the phosphorus is seen diffused through the sand, in the form of a red powder. It is allowed to cool; the sand and phosphorus are separated by decantation; the phosphorus is treated with dilute potash, filtered, washed with water, then with dilute nitric acid, and then again with pure water, and allowed to settle. The result is a brownish-red powder, without luster, amorphous, insoluble in bisulphide of carbon, alcohol, ether, naphtha, and perchloride of phosphorus. In the air it is unchanged. It is not luminous in the dark at ordinary temperatures, but becomes so when near the point of ignition. No metallic salt is precipitated from its solution.

I attach some importance to this modification of phosphorus, as I hold it to be of the greatest service to medicine. It is well known that one of the working constituents of the brain and nervous tissues, is phosphorus. This is demonstrated not only by chemical analysis, but by the large amount of phosphates in the urine, after protracted or excessive mental exercise, and in those diseases called nervous; and Dr. Reese has demonstrated the existence of a phosphorised oil or fat in the blood.

It seems to me, therefore, that the most natural medication, in many such diseases, would be to return to the system, an element in which it is manifestly deficient; and this element is phosphorus. The objection to its use has hitherto been the great difficulty attending its exhibition. Its inflammability renders it impossible to form it into a pill, and its solution in oil is highly nauseous, while that in ether is not only nauseous, but dangerous. The allotropic phosphorus, while containing all the essential properties of the ordinary kind, is free from all these objections, and can be given in a pill as safely as the simpler articles of the materia medica. The German writers recommend it in the manufacture of lucifer matches and percussion caps. Its deficient inflammability would be an objection, I imagine, to its use. The density of common phosphorus is 1·77; it dilates and inflames below 140° Fah. The density of allotropic phosphorus is 1·964; it inflames at 492° Fah. Re-action from combustion of common phosphorus, highly acid, that from the other, very slightly so.

Improvement in Lathes.

The patent granted in this week's list to Wm. Stephens, of Richmond, Ind., for an improvement in lathes, by which the common lathe, without a slide-rest, can be converted into a slide lathe, by constructing and arranging the puppet-head to become a slide-rest. The puppet-head has its lower part fitted to an arc of a sector frame, which has its socket screwed to the bed of the lathe. The puppet-head can be secured at any desired point of the arc, so as to be thrown back and converted into a slide-rest, while for ordinary turning it is set and used in the common way. It is a neat and convenient improvement.

Feeding Flour Bolts.

The nature of the improvement of feeding flour bolts, for which Samuel Taggart, of Indianapolis, Ind., has obtained a patent, embraces the result of feeding the meal at all times uniformly to the bolts. The usual method of feeding the meal to bolts in making flour, is by spouts, having a drop shoe under each. These drop shoes receive a shaking motion by cams, or wiper wheels, and the meal slides down their inclined bottoms, and is conducted to the bolts, often irregularly, by ordinary spouts. By the new plan, the "hopper-boy," which receives the meal for the bolts, is fitted within an annular chamber, through which passes a vertical shaft, having arms upon it, with sweepers secured to their ends. Directly above the "hopper boy," on the vertical shaft, an arm having oblique flights upon it, is placed loosely and is connected by cords to a rod passing horizontally through the central shaft. Spouts lead from the lower end of the annular chamber to the elevated ends of the bolts. The central vertical shaft passing through the center of the "hopper-boy," rotates and gives motion to the flight arm named, which also rotates and carries the meal towards the center of the "hopper-boy," from whence it falls into the annular chamber and is cooled, while the sweepers take and force it into spouts, which convey it to the bolts. and thus feed it in more regularly than by the shaking of the shoes.

Castor Oil Electuary.

Many persons' stomachs revolt at taking castor oil in an undisguised form. To overcome this repugnance, it has been the practice to administer it in the shape of an emulsion, which involves a large increase in bulk of the dose to be taken, as well as the employment of a considerable quantity of gum, or the yolk of an egg, to form the emulsion. To disguise the castor oil, to give it a condensed form, and to diminish, as much as possible, the quantity of the excipient, the following formula has been devised :—

Take of castor oil, 3 ounces; white soft soap, 1 drachm; simple syrup, 1 drachm; oil of cinnamon, 6 drops.

Rub the soap with the simple syrup in a mortar, and then add gradually the castor oil, with constant trituration, until it is thoroughly incorporated with the above ingredients. Finally, mix with the electuary thus formed, the oil of cinnamon, or any other essential oil that may be preferred. By these means, a gelatinous electuary will be formed which is rather palatable than otherwise, and nearly equals, bulk for bulk, castor oil in strength. The quantity of potash present in a dose of this electuary is only a homœopathic dose, and, consequently, not likely to produce a bad result in any case, even when its use should be contra-indicated.

Stuncke states that castor oil saponifies readily with alkalies, and gives with soda a solid white soap, which, in the form of pills, is a certain and agreeable purgative.

SEPTIMUS PIESSE.

London.

Heliographic Pictures

Our thanks are due to Niepce de St. Victor, for a fine heliographic likeness of the Emperor Napoleon III., forwarded to us through the kindness of Messrs. Gardissal, Paris. This new art of rendering plates capable of printing by employing the sun for the engraver, is but in its infancy, and is destined to effect a great revolution in ornamental printing. M. St. Victor is the nephew of the famous discoverer of the daguerreotype, and is a man of eminent attainments in chemistry, and the photogaaphic arts.

Spiritual Philosophy.

At a public meeting recently held in this city, it was stated that there were over three hundred thousand persons in our country who were influenced with the belief of holding communion with departed spirits, and of being influenced in their actions by them.—A second volume on the subject of spiritualism by Judge Edmonds, of this city, in conjunction with Dr. G. T. Dexter (it is published by Partridge & Brittan, 300 Broadway,) affords us a clue to form a philosophical idea of this new *belief*,

This spiritualism consists principally in believing that a power is given to disembodied spirits to use the minds and bodies of certain persons called *mediums*, for the purpose of holding conversations with them and others, who may form what are called "Spiritual Circles." These are certain persons of both sexes entertaining the same belief, who meet from time to time, and some one being in the proper state is made the vehicle of communing with the spirit world, and revealing to the rest of the circle a message or messages. The medium also sees into the spirit land, and beholds the doings of departed ghosts. Table-tippings, and the like of these things, we look upon as spirit-nonsense, but it is very evident that Judge Edmonds is a sincere man, and believes firmly in all that he has written. Sincerity, however, is no evidence of a thing being right, and a belief in what is foolish or erroneous is not entitled to respect simply because the believer is sincere. Judge Edmonds believes he has become something like the prophets and Apostles of old in receiving communications from spirits, and imparting such messages to his fellow men. He also believes that this spiritualism is intended to *conserve* and re-establish the *spirituality and religion of the race*—in short, that it is an improvement and addition to the revealed religion of the Bible. We believe we have here stated the matter fairly and clearly. Let us briefly test the question philosophically.

The spiritualists teach that man is a progressive being, and that spirits are continually progressing towards perfection. Granting this to be true (which is not a new belief,) we should find an evidence of this in the revealations received from those spirits, and if such evidence cannot be obtained, it must be concluded that spiritualism, when tested by its own touchstone, is found wanting. Well, there was old Sir Francis Bacon, whose *Novum Organum* was given to the world in 1620, and who died in 1626—229 years ago. It is acknowledged that he was one of the greatest men that ever lived, both as it respects genius and learning. He it seems has communicated several times with Judge Edmonds' circle, and his messages are given in this book. Instead of finding any progress in old Bacon, his messages betray a very common-place mind, a great want of knowledge, and sad retrogression; in short, not a Baconian mind at all, but one very like that of the medium through which he communicates. His language is very indifferent, and his ideas no less so. The first message in this book is from Bacon, and instead of discoursing in his old deep, clear, and philosophic way, we find him taken up with the domestic concerns of Judge Edmonds, accompanied with the following little bit of flattery: "I look at you and feel for you as a man, proud of you in the position you occupy, and striving to assist you in the efforts to accomplish what is before you." It is, no doubt, very condescending in Bacon's spirit to interest himself so much in the affairs of a New York Judge, but it is very evident that he has forgotten how to write the English language correctly, the last sentence especially.

Judge Edmonds describes the views which he was permitted, as a medium to have of the spirit land. He there saw houses, trees, flowers, hills, dales, streams, crops of wheat, fruit, and groups of spirits, asking one another "is the Judge's letter out." That was a letter he had published in one of our daily papers two years ago. Now, was this the spirit land he saw? If so, what are the houses and crops of wheat for? We only need houses, to shelter, and food to sustain our bodies, but none for our spirits; they are immaterial. We humbly consider that, as spirits must be wiser than us, they cannot be so foolish as to build useless houses; we therefore conclude that Judge Edmonds spiritual communications, and those of all other mediums, are only certain kinds of dreams. These mediums have worked themselves into the belief that their imaginings are realities.

In a communication from five spirits, Bacon, Swedenborg, &c., we find the following language:—"Of all the things that God has created, this world and its connections are the most material." Neither Bacon nor Swedenborg would ever have committted such a scientific blunder. Our system contains less matter than other systems, some of which embrace two, and more suns. This has been established by astronomers beyond the shadow of a scientific contradiction. We cannot but conclude, in view of these things, that mediums (spiritualists) are not exactly *compus mentus*, and that they mistake their own mental workings for communications from the spirit world. This we conceive to be the philosophy of this spiritual *belief*.

Workings of the New Steamboat Law.

When this law was enacted in 1852, we asserted that as it conferred great power on the Inspectors, and unless good and true men were appointed to such offices, it would be a dead letter on the statute books; while on the other hand, if good men were appointed, it would be the means of effecting a total revolution in steamboat navigation, as it related to safety, and the prevention of what used to be termed *accidents*—explosions and wholesale murders. It gives us great pleasure to inform our readers that the law has operated well since it went into force, thus showing that good and faithful men have been appointed to execute its provisions. The Inspectors are very strict respecting the character of engineers and pilots. They revoke licenses, and suspend them promptly upon positive proof of bad conduct or negligence. On the 21st of September, 1853, the local Inspectors at Cincinnati, O.,—Thomas J. Haldeman, and W. W. Guthrie—revoked the pilot license of T. S. Hamilton, for intemperance. On the 30th of November, 1854, he again applied for a license, and was refused, when he took an appeal from their decision to the Supervising Inspector, Benj. Crawford, who has confirmed the decision of the local Inspectors. His decision closes with the following noble and just sentiments:—

"The evidence is conclusive as to Hamilton's intemperance at the time alluded to, viz., September, 1853; and that there has been no reformation by him since that time is freely acknowledged both by words and conduct. The only point he seems to contend for, is, that he does not drink spirituous liquors while on duty as pilot; but it is clearly proven by the above testimony, that such is not always the case; and that he has at times departed even from his own standard of right, which every man addicted to intemperate habits is liable to do. I am clearly of the opinion, however, that habitual intemperance, even when off duty, or while waiting in port for a berth or some chance steamer, unfits a man to perform properly, with due regard to the safety of life, the duties required of him as pilot or engineer of such steam vessels. Therefore I could not, by giving a license, endorse any such persons to the public, as being 'skillful, trustworthy, and faithful' officers, such men as it was contemplated by the framers of the law, should fill these responsible places."

This pilot was skillful and of long experience, and only for intemperance, was a most capable officer.

The same local Inspectors suspended the license of Robert Davis, pilot, on the 3rd ult., for thirty days, because he left the steamboat *Forest Rose*, suddenly, at Wheeling, Va., at night, on the 23rd Jan., without notice, and refused to pilot her down to Cincinnati. Capt. James Timms employed Davis to steer the steamer *Forest Rose* at $300 per month. Nothing was said as to when his services should end, only that if the boat made but one trip, Davis should be paid for that trip at the rate of $225 to Pittsburg and back. At Wheeling, on the 23rd Jan., just as Capt. Timms was ready to leave, and had rung the bell, one of the clerks informed the Captain that Davis had gone home, as the boat was not going out that night. Capt. Timms then sent for him, and he came on board, but refused to pilot the boat down. The Captain remonstrated, remarking it was bad treatment to leave without notice, as he did not know where to find another pilot at that time of night; that the ice was forming fast, and he was extremely anxious to go. Davis still refused, and the Captain was detained two hours in finding other pilots.

The following is the decision of Inspectors Haldeman and Guthrie:—

"This case was brought to our notice by the pilot first bringing a charge against Capt. Timms for employing, and James Withers for serving, as a pilot on the *Forest Rose*, not having the proper licenses so to act; and in return, Capt. Timms prefers the charge annexed against the pilot, Robert Davis, for misconduct.

The charge is not denied by Davis that he left the boat under all the circumstances as related by the Captain and the clerk, but contends that he had a perfect right to quit whenever he pleased, and that Wheeling was a port of entry, where pilots could be got.

As a general thing, we have no disposition to interfere with the private quarrels of officers and masters, but where a licensed pilot so conducts himself, as Robert Davis did—quitting the boat at Wheeling, without notice, at a time of night that rendered it doubtful if others could be procured, and at such a time when the ice was forming, so as to render it doubtful, with such detention, if the boat could not get away. Besides, having passengers aboard, causing them serious detention. It is then a clear case of misconduct, arising from "inattention to the duties of his station," and as such amenable. We therefore suspend the license of Robt. Davis, who was licensed at Wheeling, Va., for thirty days from this date."

The Blessings of the New Law—We all remember how that the Ohio and Mississippi rivers used to run red every week with the blood of slaughtered victims. Now all this is changed, and since the new law has gone into force, our western steamboats have become as safe as those on the North River. The new law of 1852 was very unpopular among western steamboat owners, some engineers and pilots, when it was enacted, and meetings were held in various places, and petitions presented to Congress to have it suspended, but Congress was firm, and the law went into effect on January, 1853. The Pittsburg *Morning Post* has obtained tables from the Steamboat Inspectors of the ports of Cincinnati, Wheeling, and Pittsburg, for two years from January 1, 1853, to January 1, 1855. These three ports form three local districts, but are embraced in one supervising district. In the Pittsburg district no accident has occurred to any passenger steamboat by which life has been lost, or injury sustained. In the Wheeling district one steamboat was lost by collision, by which one of the crew lost his life. No other accident occurred, and no other passenger was injured. In the Cincinnati district no passenger has been injured, nor any lives lost by the unskillfulness or misconduct of any pilot or engineer licensed by that Board of Inspectors. The steamboat *Forrester* was burned while lying at New Richmond, Nov. 13th, 1854, by which three of the crew lost their lives, but the fire was accidental, and occurred in the middle of the night when all were asleep. In all this supervising district not a single passenger's life has been lost in two years. This is certainly a most wonderful and pleasing revolution respecting the safety of life on our western waters. Our heart is filled with pleasurable emotions in contemplating the good effects of the New Steamboat Law, and we feel that we are already amply paid for pointing out its necessity, and asking its enactment. To all our Steamboat Inspectors we have a few words to say just upon the opening of spring navigation. Be careful and not relax a single effort; be rather more strict this year than you have been before, so that we may have as good a report of you for the next as we have of you for the past year. Many have said to us, "oh yes, this will do for a little while, but the inspectors will soon become careless, and things will gravitate gradually to their old condition!" Let such anticipations fall blasted to the ground. You have executed the law with honor to yourselves for two years,—you can do so for fifty.

Incrustations and the Feed Water of Boilers.

Your correspondent, O. M., says, in the Sci. Am. of the 27th ult., that he has tried green white oak wood, and found it useful in detaching scales and incrustations from his boilers. I have had some experience in this thing, having used red oak wood in lengths of six feet and split to the size of large fence rails, the rough bark taken off; it was put in on Sunday and taken out the next Sunday (very much decayed,) and found to take off scales admirably. But after using it a few weeks we found our boilers leaking badly, and I think it injured the iron and rivets—we discontinued it, but had to get new boilers in a few months, although they had not been in use over eighteen months. I have no doubt but tanic acid is the active principle in disengaging the scale, and I think it acts on the iron also.

O. M.'s small cubes no doubt boiled into shreds, and were discharged with the water in the boilers, and it is rather singular they did not choke up some of his connection or supply pipes.

The best thing to remove scales is to put a good man in each boiler with proper scrapers and a free will to use them, and the best thing I have seen tried to prevent lime from settling in boilers is to boil your supply water with escape steam, and then run it off into a large tub, and let it cool down to 160° to 180° Fah., and supply your boilers out of that tub, putting the supply pipe in eighteen inches above the bottom of the tub, and clean out the tub every two weeks; the bottom of the tub will be found to have a foot or more of loose floculent lime in it in a floating state.

Potatoes are worse than useless, as they sometimes settle over the fire and prevent the water from getting to the iron, and thus cause it to burn.

Oil is used by some, but is still worse, as it penetrates the joints and is followed by the water and steam, and causes the boilers to leak. John Gill.

Patriot, Ind., Feb., 1855.

The Use of Snails.

Messrs. Editors—You ask on page 178, Vol. 10, who uses snails, and what do they do with them? In the Provinces of France where the vine is cultivated, snails of large size abound. They are gathered by the peasants, put in small pens for a few days, salt water thrown on them, to cause them to discharge whatever their stomachs may contain—then boiled, taken out of the shell, and eaten with a sauce; they are considered a luxury by the vine dressers.

Cataract on the eye is cured by applying a drop of clear water taken from the live snail, by piercing what might be termed the tail of the snail shell with a pin. This application has the effect of eating off the substance that grows over the sight of the eye; a relative of mine was thus cured; the sight was totally eclipsed of one eye; by applying this water two or three times a day, for some time, say two or three months, the sight was restored, and remained good. This was prescribed by a physician as a last resort. M.

572 Third Avenue, N. Y., Feb. 19, 1855.

A fine new steamship named the *City of Baltimore*, was lately launched in Glasgow, Scotland, for the Liverpool and Philadelphia Steamship Co. It is 2200 tuns burden, and is to be the consort of the *City of Manchester*.

New Inventions.

Improvement in Grain Separators.

The annexed engravings are views of an improvement on smut and grain separators, for which a patent was granted to John D. Bedwell, of Urichsville, Ohio, on the 24th of October last.

Figure 1 is a vertical section of the machine, and figure 2 is a horizontal section of the stationary and revolving smut cylinders. Similar letters refer to like parts.

A is a frame which supports the several parts of the machine; B is a fan box placed directly under a platform, *a*, of the frame, and C is a curved trunk, one end of which commences near the bottom of one side of the fan box, and passes upward and forms a curve and descends at the bottom of the fan box opposite to the side first mentioned. D is the fan placed within the fan box, B, and hung upon a vertical shaft, E. On the lower part of the shaft, E, there is a pulley, F; the shaft, E, extends upward through an air tight box, G, which is placed on the upper part of the platform directly above the fan box, B. The box, G, communicates with the trunk, C, by means of a horizontal passage, H. This passage also communicates with the fan box, B. On the shaft, E, and within the box, G, there is placed a cylinder, I, which is formed of a series of flat metal bars, *b*, secured vertically to top and bottom heads, *c c*. These bars are so attached to the heads, *c c*, as to overlap each other, and the outer edges of the bars in an operating machine, may be about half an inch distant from each other, the space between the bars being sufficiently small to prevent grain from passing through, but at the same time admitting a current of air.—Around the cylinder, I, and within the box, G, there is a stationary cylinder, J, constructed precisely similar to the cylinder, I, with the exception that the bars, *b*, may be placed closer together, so that the spaces between them are not more than one-sixteenth of an inch apart. The space between the two cylinders, I J, may be about half an inch, and from this space a spout, K, leads into the trunk, C; L is a valve at the upper part of the trunk, C. At the upper part of the box, G, there is an opening, *d*, through which the grain is admitted into the space between the two cylinders, I J.

OPERATION—Motion is given the fan, D, and the cylinder, I, by means of a belt passing around a pulley, F, and the grain to be cleansed is poured into the space between the two cylinders, I J, through the opening, *d*, as the cylinder, I, rotates, the smut is scoured from the grain, and pulverized or broken by means of the edges of the bars, *b*, which give a corrugated surface to the cylinders. The fan, D, causes a current of air to pass through the trunk, as indicated by arrows, 2, the grain indicated by arrows, 1, passes from the cylinders down the spout, K, into the trunk, C, where it is subjected to the blast which carries upward in the trunk, the smut, dirt, chess, etc., indicated by arrows, 3, and the grain separated from impurities falls from the trunk. Certain portions of the smut and dirt also pass through the cylinder, I, and is drawn down into the fan box, B, by the action of the fan, and forced out a passage represented by *e*, at the side of the fan box. The portions of smut, dirt, chess, etc., that followed the grain into the trunk, are carried over the curve at the upper part of the trunk, and the smut, dirt, and light particles are drawn into the fan box, B, at the connection of the passage, H, with the trunk, while the heavier substances of some value, such as chess, light grain, etc., see arrows 2', will resist the power of the current, and fall from the spout at the end opposite to that from which the perfect grain passed. By regulating the valve, L, at the upper part of the trunk, C, the blast or current within said trunk may be increased or diminished, as desired.

This valve is to obviate any evil from excess of fan motion; it is self-adjusting, and opens by outside atmospheric pressure; and suction draft along the trunk, C, so that when the blast is too strong, and carries over wheat, by giving the movable screw weight on the end of the lever of the valve, L, a few turns, it is brought nearer the valve, and allows of it being opened by excess of blast, to prevent the wheat being carried over.

By the above invention the grain is thoroughly cleansed from all impurities, and the sound grain, smut, and dirt, and chess, and imperfect or light grain are separated from each other. By this arrangement the smut is more rapidly and thoroughly expelled or drawn off, and separated from the grain whilst scouring through the meshes or spaces of the two bar cylinders, thereby avoiding discoloration of the wheat by loose smut adhering to the blossom ends of it, and whereby the wheat is more perfectly separated and cleansed from smut, dirt, and other impurities.

The patentee informs us that he is now building these machines, and has constructed a number, every one of which has given the most entire satisfaction.

More information may be obtained by letter addressed to him at the above-named place.

SMUT AND GRAIN SEPARATOR.

Fig. 1

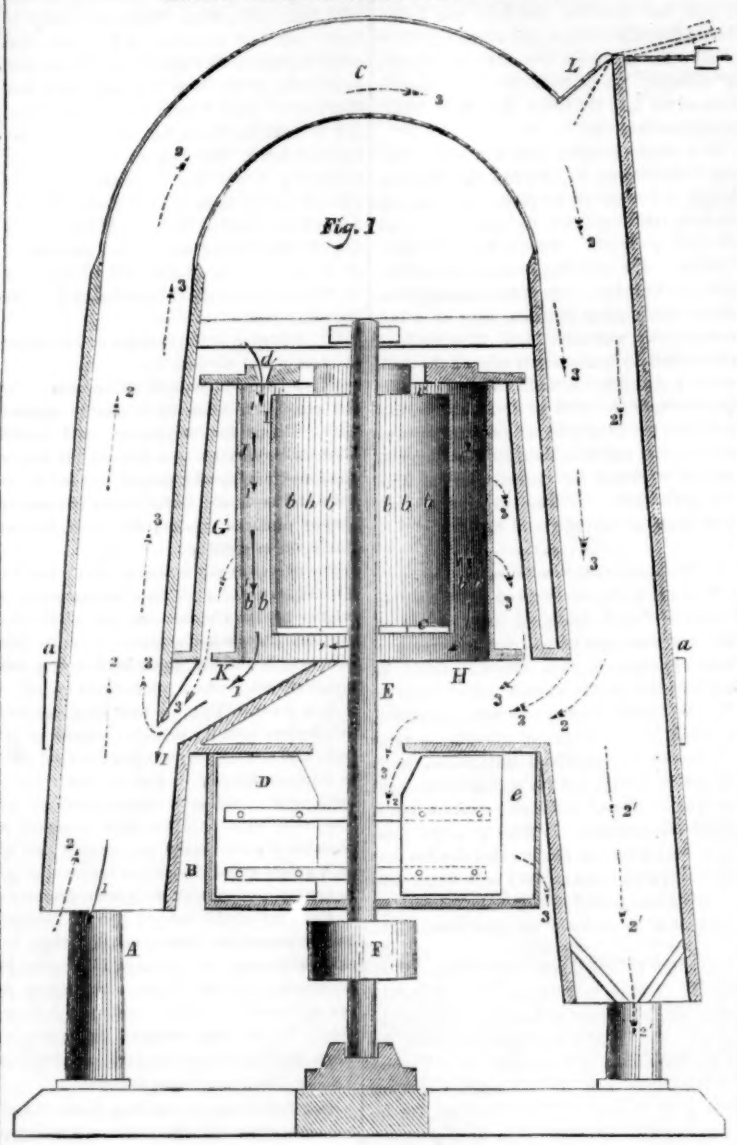
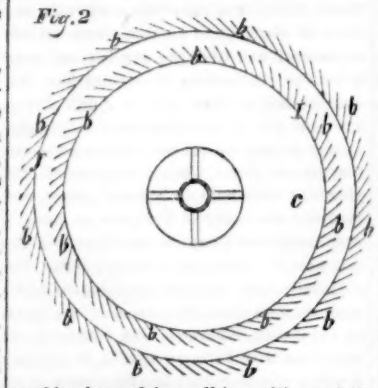
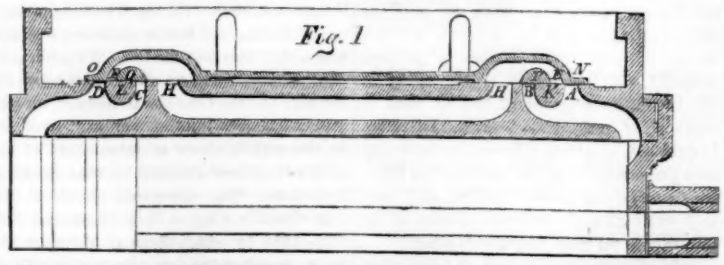


Fig. 2



IMPROVED SLIDE VALVE.

Fig. 1



The annexed figure is a longitudinal vertical section of an improvement in slide valves for steam engines, for which a patent was granted to W. C. Hicks, of Hartford, Conn., on the 9th of Jan. last. The figure shows a section of the valve seat, the latter being cast on the side of the cylinder, and the valve moving on its face steam-tight.

A B C D are posts connecting with the ends of the cylinder. A and D for admitting, A B C and D for exhausting steam from the cylinder. K and L are bars solid with the cylinder. H is an exhaust flue connecting with the air heater or condenser. N P Q O is the valve with the bars, P Q, cast across its face and solid with it. E and F are exhaust passages. The valve moves to the right far enough to open the post, D, then to the left to open the port.

Some engineers make large steam ports for exhausting rapidly; this requires an increase of valve and throw of the eccentric; this valve obtains the same object with a short throw. As the inlet ports are not required to be so large as the exhaust, the valve combines the narrow inlet and large exhaust ports. The patentee has practically tested this valve for some time, with a great saving, he assures us, of fuel. No more explanation is necessary, as the figure renders the matter clear to every mechanic.

More information may be obtained by letter addressed to Mr. Hicks, at Hartford.

Gates of Water Wheels.

The claim for an improvement in gates for water wheels, in this week's list, for which a patent has been granted to Geo. N. Todd, of Dundaff, Penn., embraces the regulating of the space of the water gate by a float, to equalize the quantity of water flowing on to the wheel, although the volume of supply may be irregular. The gate swings on gudgeons at the top, like a clapper valve; to its lower end is attached a chain, secured to an oscillating lever an a horizontal shaft, which lever is also attached to another chain connected with a float, resting in the supply water, and rises and falls according as its volume is increased or diminished, which thus operates the lever named, and actuates the chain attached to the bottom of the gate, so as to draw it further from or allow it to be pressed closer to its seat, to increase and diminish the water opening.

Improved Skate.

Although the winter is fast merging into spring, and although we heartily hope that good skating is over within these diggings, the improvements in the construction of skates, for which two patents have just been granted to N. C. Sanford, of Meriden, Conn., must not be forgotten by those who reside further to the North. The simple object of these inventions is to give the skate elasticity so as to enable a person to skate with more ease. Small tubes are placed vertically within the stock of each skate. In these tubes are placed india rubber springs connected with knees secured to the runner, which is also thereby firmly attached to the stock, by which it gives some spring to the foot, and its use is thereby rendered more easy.

The second patent embraces the dividing of the skate, and connecting the two parts by a spring, and having the runner elastic, whereby the skate yields, and the back part rises with the heel, when the weight of the body is thrown upon the front part of the skate.

Improved Straw Cutter.

The claims on another page for an improved straw cutter, the invention of Jas. H. Bennett, of Bennington, Vt., relates to the kind of straw cutters employing a straight knife set in a lever, and moving in the arc of a circle. The knife stock is set in a vertical oblong slot cut through the main timber of the frame, and working on a pivot in the slot. By this arrangement the knife is guided and kept steady while operating. There is a flat spring arranged over the front part of the oblong slot, and the knife is so bevelled, that when its lever is lowered, it—the knife—bears upon the upper side of the flat spring, while the underside of the lever bears upon its top, thereby keeping the cutting-knife close up to the steel guard, thus making it cut in a superior manner. The said spring, in case of clogging, yields slightly, and its re-action after a cut assists the operator in raising the lever which operates the knife.

Chimney Safes.

The chimney safe of Geo. B. Clark, of Leonardsville, N. Y., whose claim is on another page, is designed for a better regulation of the draft, and the prevention of fires in chimneys. A box is placed in the chimney when it is built, and it is so provided with dampers as to regulate draft. It has also a receiver to catch and convey away any rain that might enter the chimney. It is designed to be put in the chimney when the building is being erected.

Scientific American.

NEW YORK, MARCH 3, 1855.

Review of the Proposed Amendments in the Patent Laws.—Important Movements in Congress.'

In a recent number of this journal, after commenting upon the origin and the efforts which were being made to press upon Congress the hurried passage of a bill providing for a radical, and, as we believe, highly injudicious alteration of the Patent Laws, we gave it as our opinion that the present regulations were about as satisfactory as any that could be devised, and that no alteration, further that some simple provision to increase the revenue of the Patent Office, was at this time very pressingly required.

Unlike the other revenue systems, it appears that at present the more money the Patent Office receives, the further off it gets from paying its way. In other words, the larger the number of patents applied for, the greater becomes the proportionate expense of examining each case.

This reminds us of the enterprising boy who excused his want of punctuality at school, by saying that the ground was slippery, and that for every forward step he took he slid backwards two.

The object of the Hon. Mr. James' Bill, now before the Senate, is to remedy the above evils and some others, which the present patent system is supposed to contain. Let us examine into the composition of the proposed panacea, and see if it probably contains the healing elements.

It strikes us that the Bill might very properly be described as a series of ingenious projects for squeezing money out of inventors, and with equal ingenuity conveying it into the pockets of patent agents and lawyers. The idea of benefitting and encouraging the inventor seems to have been cast out altogether. Under its humane provisions an inventor, if he be so unfortunate as to get a patent, becomes a legal goose, subject to a most indiscriminate pluckage: it is a Bill which clamors for Money, *Money*, MONEY, without offering proper return.

The following are specimens of its blessings:—

If an inventor asks for a patent with a specification ending with one claim, he pays for the privilege of asking (not obtaining, mind) the sum of $20. For additional claims, not exceeding three, $5 extra for each. For additional claims, beyond three, $10 extra on each. Therefore the government fees demanded for the mere asking for a patent, in which six claims are necessary (which is very often the case,) amount to $55. If the application is rejected, and the applicant appeal to the Commissioner, he pays another fee of $10, making $65. If he then appeal from the Commissioner to the Judge, he pays another fee of $25, amounting, in all, to $90—the whole of which is lost if the application fails. [Under the present law the inventor loses $10 only of the patent fee if his case is rejected.]

Should the last appeal be successful, and the patent, with its six claims, as described, be accordingly granted, the inventor is called upon before receiving the same, to pay a final fee of $50, making a sum total of $140 in official dues, and his patent then lasts only five years. By the payment of another fee of $100, before this period expires, the patent can be extended for fifteen years longer. This makes the total official fees for the parchment and nominal grant of the patent, $240, in place of $30—being an increase of *eight hundred per cent.* over the present rate.

If his patent document, like a telegraph message, exceed a certain number of words in length, the inventor must pay more fees.

Should the applicant have been so unfortunate as to claim too much, he can, by paying another fee of $10, have one of his claims (for the grant of which he had before paid a fee of $10) stricken off.

After having run the gauntlet of all these official fees, the inventor is no nearer the actual possession of a patent that when he began. True, he has procured the parchment with the picture of the Patent Office engraved thereon, and nominally he is a patentee: but to make his patent worth anything, he must obtain what is termed a CONFIRMATION of the same; the first step towards which is to pay a new fee of $100. This secures to him the desirable privilege of having anybody who is so disposed, come forward and claim the patent as theirs by reason of previous invention. If they bring proof of their priority, our newly fledged patentee is summarily upset—his patent is invalid—and he goes to grass with a total loss of everything—time, money and patent. How much he has spent for the hire of lawyers and agents, to defend himself, in addition to the enormous bill of official fees, can better be imagined than named.

If the applicant succeeds in preventing others from destroying his patent, a certificate of "Confirmation" is given by the government, and subsequent patents to others for the same thing are denied.

In order to attack a confirmed patent, the plaintiff must first pay a fee of $50 to the Patent Office.

Legal proceedings in various forms may now be had to annul the confirmed patent, and it may be kicked about among lawyers and courts, like a shuttle cock between the battle-doors, until the Supreme Court gets a chance at it. The decision of this tribunal is final. If adverse, the patent receives its quietus. If favorable, it is forever confirmed.

Another section of this benevolent Bill authorizes the Commissioners to have 4000 copies of the drawings and specifications of each patent made, for purposes of sale and distribution, at an expense of $400 for every patent. Last year over 2000 patents were granted, which, if engraved and printed under the above beautiful provision, would permit the Commissioner to expend therefor the sum of *eight hundred thousand dollars.*

Another clause appoints an Assistant Commissioner to attend to most of the duties now performed by the Commissioner—thus rendering the Chief's office almost a sinecure. The Commissioner's salary is also raised to $4,500 a year. The number of employees in the department is also increased.

The foregoing is but a brief outline of the most prominent changes which the amendment, now before Congress, proposes to effect. It fills us with astonishment that any Senator or officer of the government should seriously put forward such an absurd and incongruous "mess of pottage," and call it an *improvement*—a remedy for present ills. Why, it makes our patent system more cumbersome and expensive than the old British plan. Instead of increasing, it decreases the value of patent property. Instead of simplifying, it adds intricacy to complication. Instead of encouraging inventors, it lays new and grievous burdens upon them. It robs them by wholesale of their property, and divides it between the coffers of an overflowing treasury and the pockets of hungry politicians, lawyers, and patent agents. That it must meet the entire disapprobation of the great body of inventors and patentees, is too apparent to require demonstration. If the question of its adoption were submitted to them for decision, we believe they would rise up *en masse* in opposition.

Senators seem *possessed* with the idea that our Patent Laws require some huge and hurried alteration. In their zeal to do *something*, they propose to strike in the dark—to act without properly understanding the subject, But we hope they will not forget that the country has a most vital interest in all that touches its Patent Laws—that whatever benefits and stimulates the inventor, promotes the general prosperity and fame of the nation. And, on the other hand, whatever trammels and discourages genius, produces just an opposite effect.

We are convinced that members are right enough at heart, on this matter. Our anxiety is, lest they should suffer their votes to be cast without proper deliberation and discussion. Powerful efforts, we presume, are being made by interested persons to have the absurd Bill shoved through *without discussion or inquiry.* We entreat Senators to beware of such trickery. Let them postpone action until they can examine the subject for themselves, for we repeat, no *instantaneous* legislation is required. The present efficiently administered system gives very general satisfaction, and unless it can be improved, it should not be touched. The old adage, "Let well enough alone," applies in this case with great force.

The augmentation of the revenues of the Office is a very easy matter, when the proper time for it arrives. *Amend the law so as to restrict the official examinations of novelty to this country only, and the thing is done.* Add to this, if you please, a clause that models, after examination, shall be restored to applicants. Either or both of these simple provisions will bring in far more revenue than the Bill now before the Senate, and avoid all its disastrous consequences.

The reason why it costs more to grant a patent than the Office receives, is, first, because the examiners are required to search the whole world over to ascertain if an applicant's invention—a straw cutter or a churn perhaps—is new. To examine the pages of all the musty French, Dutch, Italian, and other foreign volumes which the shelves of the Patent Office Library contain,—and which are steadily increasing—is no easy matter, and is besides a great expense. Second, the plan of keeping together, in one vast storehouse, ready classified for reference and exhibition, the thousands of models which the country has in times past, and is now constantly producing, is exceedingly expensive. Lop off these two costly excrescences from the current system, and the revenue of the Patent Office will soon be greater than its actual wants, while the present moderate rate of fees may be retained, and better justice done to American inventors.

How far superior would some such simplifying method prove, than the clogging up of the entire system with an interminable list of official fees and tortuous legal proceedings.

Artificial Manure—Deterioration of the Soil.

It is a positive fact that, while we send vessels to the Lobos Islands thousands of miles distant, and pay some millions annually for guano, in all our cities and villages we suffer the best of fertilizing materials to run into the sewers. Something must be done, and with alacrity, for economizing American agriculture. For want of pursuing a proper system of agriculture, the products of various States have been falling off for the past ten years. In Massachusetts, the *New England Farmer* has stated that, from 1840 to 1850, the hay crop had depreciated 12 per cent., although 300,000 acres had been added to those previously under tillage. The corn crop during the same period fell short 6,000 bushels; there had been a falling off 160,000 sheep, and 70,000 swine. In the State of New York from 1845 to 1850, 671,692 acres were added to those previously under cultivation, and yet there had been a most alarming falling off in all kinds of agricultural products. The number of horses had decreased 50,141; milch cows 68,066; sheep no less than 2,990,624; hogs 566,092; potatoes 7,255,066 bushels; peas and beans 1,182,054 bushels; flax 1,956,485 pounds; wheat 270,724 bushels; buckwheat 450,724 bushels. There was an increase in corn, rye, oats, barley, hay, butter and cheese, but no greater than the increase of population in that period, viz., 494,323 persons. No wonder potatoes are so dear; such a falling away of this crop accounts for it all. In Kentucky and Tennessee there has been a great decrease in cattle in ten years; no less than 33,786 of neat cattle in the former, and 72,086 in the latter State. In Indiana and Wisconsin there has also been a falling off in the amount of crops raised, especially wheat, on the rich lands. If this rate of depreciation goes on for twenty years more, we will have to import grain from other countries, instead of exporting to them, as we hitherto have done. The remedy is a better system of agriculture, especially a more liberal supply of fertilizing matters. It is very evident that unless soils have returned to them every year as much fertilizing matter as that which is taken away in crops, they must depreciate. There can be no mistake about this; it is plain to every man. There may be various ways of restoring this to the soil, but unless it is restored, the work of deterioration must go on. Those farmers who suppose they can, year after year, sell large crops of hay, wheat, oats, barley, potatoes, and butter, and supply but a scanty amount of manure to their farms, exhibit a great want of common sense and forethought. The grand idea, however, for the farmer, is to get a cheap supply of fertilizing matter, for it is very evident that if his fertilizers were to cost him as much as the returns which he receives for his surplus products, it would be no object for him to raise crops for sale. The cheaper the fertilizer, then, the more profitable must be the business of farming, the more abundant will be the crops, and the people will thereby be supplied with cheaper bread.

In England we perceive that great attention has lately been paid to obtaining the mud of sewers for manure, and were some company organized in this city to keep the sewers clear, perhaps a million of dollars might be saved annually to the farmers within an area of twenty miles from the City Hall. It would also be the means of making our city more healthy by removing the pestilential effluvia which arises in warm weather from sewers, and it would save a vast annual outlay in keeping our docks from being filled up with the great quantities of mud which are swept down into them, especially during heavy showers. A patent for making sewerage manure has been taken out recently in England by Thomas Wickstead, C. E. It consists in mixing sewerage water with charcoal dust and lime, then allowing the matters to settle in large vats, and running off the clear repeatedly until the lime and charcoal are perfectly saturated, after which it is dried, and put on land.

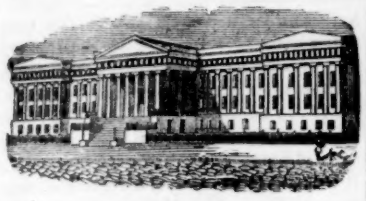
Alex. Manning, of London, has also obtained a patent for making manure from sewerage water, by employing lime and charcoal mixed with the sludge water obtained in making alum, which consists of sulpate of alumina. Charcoal and lime appear to be the best substances for deodorizing sewerage water, and absorbing the ammonia and phosphates contained in them. The simple question of converting sewerage into useful manure, for any company, is one of dollars and cents, and we cannot decide on this point. Our object is to direct attention to the obtaining of cheap fertilizers by any means, and that as soon as possible.

To Subscribers.

The next number will complete the first half of the tenth volume of the SCIENTIFIC AMERICAN. We would respectfully solicit those whose subscriptions expire next week to renew them at an early date. We are much obliged to you for past favors, and hope to have you continue with us as heretofore. Business, we know has been very dull this winter in many places, but one dollar for six months subscription of the only weekly paper in our country devoted to science, invention, and mechanics, is certainly not much. We believe there are very few mechanics in our country but can afford to pay for it; and we know that no one can be intelligent,—that is, posted up in the inventions and discoveries of the day,—unless he reads it. It is the repertory of American inventions, and contains notices of all the useful discoveries and improvements in the arts. This volume, when completed, will be the best ever published.

White Maple Sugar.

A Vermont farmer says the following is a sure method of clarifying sugar:—Filter all your sap before boiling, through a hopper or box of sand, which, he is satisfied, will take out, not only all the stains derived from leaves, tubs, crumbs of bark, but all other coloring matter that can prevent the sugar from being pure white.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 20, 1855.

FEEDING PAPER TO PRINTING PRESSES—A. B. Childs & H. W. Dickenson, of Rochester, N. Y. : We claim as our invention the raising and delivering the sheets by means of the inward and outward currents, said currents being produced and operating in one and the same trunk through one and the same slit or opening by means of the fan or its equivalent, trunk, c, valve, c2, revolving trunk, c', pipe, g, and aperture, m, and in combination therewith we claim the outward blast, produced through the trunk, e, by the means set forth.

We claim, in combination with the inward blast through the revolving trunk, c', for raising the paper, the outward blast through revolving trunk, i, for separating the sheets, as described.

We claim the projecting trunk, d, in combination with the main trunk, c', in the manner and for the purposes set forth.

We also claim the combination of the regulating and supply valve, b, with the shut off valve, c2, in the manner and for the two fold purpose, as set forth.

SEWING MACHINES—E. A. Forbush, of Ashland, Mass. : I would remark that I do not lay claim to any method of drawing the thread through the work by seizing the needle by a pair of pincers, and performing the whole operation of drawing the thread close into the work by draft on the said needle ; nor do I claim a mode of drawing the thread into the work by means of a tripping roller moved by an endless chain.

But I claim combining with the carriage, T, the clamps, a b, and bearer, V, or mechanism which draws the needle through the work, a set of pincers, S S, made to firmly grasp the thread between the needle and the work, and to be so moved away from the work as to draw the thread firmly into it, as specified.

And in combination with the said machinery for holding the needle and drawing it through the cloth or work, I claim machinery or mechanism, viz. the carriage, c, the clamps, a b, and the bearer, V, operated as described, or their equivalents, for rotating the needle or turning or rotating it around 180 deg., or end for end, as above specified, such mechanism allowing me to make use of a common or ordinary needle made with one eye and but one point, as described.

I also claim the combining with the nippers, S S, and the vibrating arm, R, the carriages, L and T, the spring bolt and contrivances for operating it, as set forth, the same being not only to draw the thread into the work with sufficient tension, but to do so under any change in the length of it, essentially as specified.

I also claim the combination of the rotating bearer, V, the two needle clamps, a b, and the vertical rotary shaft, c, as operating together, or operated substantially as described, and for the purpose of holding, releasing, and reversing the needle or turning it around, substantially as above set forth.

I also claim to combine with the rotary bearer, V, and its clamps and shaft, c, or machinery for holding, releasing, and directing a needle into the work, a propeller, a5, operated or made to operate substantially in the manner and so as to force the needle into the work, as specified.

I also claim to combine with the spring nippers, b2 c2, or machinery for taking up the slack of the thread and preventing entanglement of the thread, while the carriages are being moved towards the work, the sliding carriage, S2, or mechanism operating as described for preventing the weight of the said spring nippers, b2 c2, and their slide, d2, from being thrown upon the thread so as to break the needle or displace, it, while it is being turned around, as set forth.

BANK LOCKS—Frederick Denzler, of New York City : What I claim consists in the lever, F, in connection with its spring lever, G, together with the dog, H, acting upon the lever, F, said dog, H, being actuated by the dog, E, for the purpose of preventing the fallar, C, from being turned.

CHIMNEY SAVES—G. B. Clarke, of Leonardsville, N. Y. : I am aware that a narrow frame piece, having a damper or valve, has before been fitted in the chimney above the point of entry of the smoke, to regulate the draught and aid in extinguishing fire in the chimney, such therefore I do not claim.

I am also aware that locomotive engine chimneys have been provided with water vessels or tanks to extinguish sparks carried up by the draught : this, therefore also, separately considered, I do not claim.

But I claim the smoke box or chamber, arranged in the chimney, as described, and having dampers, E, above, and a conical or other equivalently shaped receiver, C, below the point or points of entry of the smoke, as and for the purpose set forth.

[This invention is noticed on another page.]

LIFE-SAVING RAFTS—George Blanchard, of Washington, D. C. : I claim, first, the arrangement of the toggle or jointed levers, B, in relation to the buoyant cylinders or floats, and the catches or locks, C D E, by which, when let fall, the raft, by its own weight, is extended and locked and made entirely ready for immediate use, as set forth.

Second, I claim the arrangement of the braces, G, with the chains, F and K, in connection with the floats or buoyant cylinders, and jointed levers, for the better sustaining of the bed formed by the extended levers, and for the holding of the parts of the raft together in a sufficiently firm and yet yielding condition to enable the raft to be a safe and well sustained life-preserving structure, as described.

METALLIC SPRINGS—Levi Bissell, of New York City ; ante dated Aug. 20, 1854 : I claim the combination of the rigid bar and the thin metallic strap with their extremities rigidly attached together in the manner and for the purpose substantially as described.

STRAW CUTTERS—J. H. Bennett, of Bennington, Vt. : I claim the use and arrangement of the double acting spring in combination with the arrangement and beveled shape of the knife, substantially as and for the purpose set forth.

[A description of this invention may be found on another page.]

MILL STONE DRESS FOR HULLING RICE—C. R. Barnes, of Owego, N. Y. : I claim the method described of dressing horizontal stones for hulling rice, the runner having curved furrows in connection with, or separate from straight furrows, and the bed stone having smaller curves draughted thereon, substantially as described and shown.

FLUID BURNERS—Yarnall Baily, of West Chester, Pa. : I am aware that heaters have been applied to lamps, in contact with the flame for similar purposes heretofore, therefore I do not claim the idea or invention of generating the vapor by the use of heaters arranged in contact with the flame of lamps or gas burners.

But I claim the construction and arrangement of the heaters, D D, in combination with the generator, B, for the purpose set forth, substantially as described.

SCREW WRENCHES—S. H. Noble, of Westfield, Mass. : I claim the application of the spiral or other spring, as in part c, the thumb piece part, A g b, and the spring under the thumb piece, part b, in such a manner to the common screw of screw wrench, as to create a backward and forward self-adjusting motion of adjustable part of screw wrench now in use.

BULLET MOLD—J. S. Keith and John Brooks, of Canton, Mass. : We claim combining with the mold plates, A and B, the air and lead chambers, C and H, the passages, c e, and a tube, F, leading out of the chamber, C, and terminating above the level of the receiving space above the upper mold plate, the object of the said chambers, G and H, connected with the several matrices, as described.

And we also claim the arrangement of the outer surface of either of the mold plates tangentially to the spherical or adjacent surfaces of its several matrices, or so that after the mold has been filled with metal, and the sheet of metal against the tangential surface removed therefrom, the balls shall be left for all practical purposes without sprues, or in a state fit for use, as specified.

We also claim arranging two or more sets of mold plates and their matrices together, so that the matrices of each set shall be made to respectively communicate with those of an other set placed either above or below it, as specified.

DRIVING PAIRS OF RECIPROCATING SAWS—G. P. Ketcham, of Bedford, Ind. : I claim operating the saw sashes, B B, by means of the inclined wheel or cam, D, and lever, E, with its pendents or projections, b b, the parts to be operated being connected to the ends of the lever, E, by rods or pitmen, G ; the above parts being constructed and arranged substantially as shown.

[See notice of this invention in No. 16, present Vol. SCI. AM.]

PUMP VALVES—Gustavus Hammer, of Cincinnati, Ohio : I claim the manner described of connecting the inducting valves, 2, of one end of a double or single acting pump with the educting valves, 1 1, at its opposite end, on or to a separate stem or spindle, so that each set of valves may have an independent movement of the other, in its operation, substantially for the purposes set forth.

I also claim the combination of the two educting valves, 1 1, with the inducting valve, 2, in order to give each opening an equal area with a given movement of the valves, as set forth.

PREPARATION OF PAPER FROM RESINOUS BARKS—C. C. Hall, of Portland, Me. : I claim the process of preparing paper pulp, as described, using the entire substance of the bark of resinous wood, in which I retain the resinous and gummy matter within the substance of the barks to act as a size or stiffening for the paper.

HARROWS—Daniel Haldeman, of Morgantown, Va. : I claim the so forming and hinging together of the frames or frame pieces of a harrow, as that it may be susceptible of such an adjustment as represented, and so that it may be folded up and rest upon a portion of the frame which forms a sled, upon which it may be conveyed from place to place, as described.

CUTTING TENONS—Joel Hastings, James Ramsey, and H. G. Chamberlain, of St. Johnsbury, Vt. : We claim, first, the arrangement of the two advancing and retiring tenon heads, the clamping piece, m, the dog, o, and the fly, N, substantially as described.

Second, the construction of the cutter stocks and arrangement of cutters, substantially as described, to wit : the cutter stock being composed each of an open flanch, D, attached by a yoke or arms, d d, to its shaft, with a disk, a', bolted to the said flanch, and having the cutters, b c, secured one to its face and the other to its back.

Third, the fly, N, arranged and operating in any way, substantially as described.

[In No. 15, Vol. 10, SCI. AM., may be found a description of this invention.]

MAIZE LEAF AS A SUBSTITUTE FOR TOBACCO—Joseph G. Goshon & S. M. Eby, of Shidlersburg, Pa. : We claim preparing the leaf of Indian corn, substantially as set forth, for the purposes specified.

SEPARATING ZINC WHITE—Samuel Wetherill, of Bethlehem, Pa. : I claim the combination of the chambers, e, g, and s, or their equivalents, arranged and operating as set forth.

And I also claim the method of effecting the partial cooling of the white oxyd of zinc and gases before they reach the final cooling chamber, by currents of air passing through the hollow spaces in the surrounding walls, substantially as specified.

GRIDDLE—Carington Wilson, of New York City : I claim constructing the griddle by attaching to the under side of the main plate by casting or otherwise the rim or flange, c, into which is fitted the supplementary plate, a, in such manner as to form an intervening space or cell, b, substantially as and for the purpose set forth.

WATER WHEEL—Thomas Tripp, of Sandy Creek, N. Y. : I claim so constructing the buckets that the direct surface of the warped surface bucket shall receive the water in a direction normal to a plane parallel to the axis ; and the reacting surface combined therewith, having its central line equidistant from the axis, and at the same distance therefrom, as is the central line of the direct surface.

SELF-REGULATING WATER GATES—G. N. Todd, of Dundaff, Pa. : I do not claim the employment or use of a float for operating the gate or regulating the amount of water supplied, irrespective of the special mechanism described and used for effecting the above purpose, for floats have been previously used in various ways.

But I claim having the float, H, attached by a chain or rod, G, to the outer end of a lever, E, which passes transversely through a shaft, D, on the upper part of the flume or penstock, B, the inner or opposite end of said lever, E, being attached to the gate, C, by a chain, F, by which the gate, C, is raised or lowered to admit the requisite quantity of water to pass through under a variable head, as shown and described.

[A brief notice of this invention may be found on another page.]

FEEDING FLOUR BOLTS—Samuel Taggart, of Indianapolis, Ind. : I claim neither the hopper boy nor the flight arm with flights attached, separately, for they have been previously used.

But I claim the combination of the annular chamber, c, with its sweeps, d d, as arranged for the purpose set forth.

[See notice on another page.]

SLIDE RESTS FOR LATHES—Wm. Stephens of Richmond, Ind. : I claim attaching the puppet head, J, to the lathe, as shown and described, viz., by having a sector frame, I, attached to the socket or collar, H, and having an arm, K, all the lower part of the puppet head, the lower end of the arm being secured to the lower end of the sector frame, and the puppet head fitting or working on the arc, b, of the sector frame. The puppet head being operated or moved by a screw rod, N, or its equivalent, and secured at any desired point on the arc, by a set screw, L, by which the puppet head may be so adjusted as to allow articles to be turned between the centers of the spindle and mandrel as in ordinary lathes, or the puppet head be used as a slide rest for forcing or cutting plates on a chuck, as described.

[See notice of this invention on another page.]

CUTTING WOOD INTO SLIVERS—Samuel R. Smith & Elijah Cowles, of Hadley, Mass. : We claim giving the necessary feed motion to the cutters by means of the lever, H, with the segmental rack, G, attached to one end, which rack gears into the recesses, c, cut in the lower end of the shaft, B ; the opposite or weighted end of the lever being raised by the cord, e, which is wound around a clutch, g, on the shaft, J ; motion being given the shaft, J, by the worm wheel, K, and screw, L, substantially as shown.

Second, we claim giving the necessary direction to the cutters while passing over the stuff, a, by means of the rim or ledge, y, on the disk, Y, said rim or ledge having a bent or curved portion, z, which, in consequence of the arm, w, working upon it, communicates the proper motion to the cutter stocks, so that the cutters will pass over the stuff in a right or straight line, as described.

[For a description of this invention see No. 14, present Vol. SCI. AM.]

AIR HEATER—William Sage, of Durham, Conn. : I claim surrounding the chamber of combustion with series of short annular or segmental air heating compartments, a a, which are combined with series of inclined air induction pipes, b b, and communicate with the hot air reservoir, e, which surrounds said compartments by means of the eduction apertures, i i, substantially in the manner and for the purpose set forth.

SKATES—N. C. Sanford, of Meriden, Conn. : I claim securing the runner, B, to the stock, A, by having disks, a a, on the upper ends of the knees, c c, these disks being fitted within tubes or cylinders, D D, in the stock, the tubes or cylinders having a suitable elastic material within them, and their upper and lower ends covered by plates, b, secured to the stock, whereby a requisite degree of elasticity is given the skate, as shown and described.

SKATES—N. C. Sanford, of Meriden, Ct. : I do not claim merely forming the stock of two parts for that has been previously done ; but I claim having the stock, A, of the skate formed of two parts, B C, and connected by a spring, D, when said stock is combined or used in connection with an elastic spring runner, E, for the purpose set forth.

[Mr. Sanford has two patents granted him this week on skates, notices of each will be found on another page.]

HAND CULTIVATOR—J. A. Robinson, of Poplin, N. H. : I do not claim the yoke, A, nor the knives, B ; but what I claim is the instrument, as described, for weeding and cultivating plants in rows, the same consisting substantially of the combination of the yoke, A, with the knives, B, constructed and operating in the manner and for the purpose set forth.

MANUFACTURING HOOPS—Jacob Peirson, of Alexandria, Va. : I claim, first, a vibrating or traversing frame carrying a rotary cutter, so constructed and arranged that the cutter may be made or allowed to plane or cut its full depth, or a proper depth in crooked as well as straight logs, so as to make the hoop or other article formed by the cutter, parallel or nearly parallel with the grain of the wood, substantially as described.

Second, in combination with the frame and cutter mentioned in the first claim, I claim the circular saw, O, so arranged and operated as to separate the hoop or article formed by thr above mentioned cutter, from the log, substantially, as described.

Third, in making the rests or guides, x, which govern the position of the traversing frame, rotating cutter and saw, o, to traverse on the log, substantially as described, so as to cut the hoop or other article parallel or nearly parallel with the grain of the wood.

CARRIAGE WINDOWS—J. T. Ogden, (assignor to himself and Thos. Goddard,) of Boston, Mass. : I claim the method, substantially as described, of withdrawing the sash through the rear stile of the door, and retaining the door bolted while the window is partially open, in the manner and for the purpose set forth.

PAINT MILL—C. W. Brown, of Boston, Mass. (assignor to G. W. Banker, of Watertown, Mass., and G. O. Carpenter, of South Reading, Mass.) : I claim, first, attaching the trough, N, which receives the ground paint or material to the running stone, F, so that it may rotate therewith for the purpose of obviating the difficulty experienced in paint mills, where the lower stone is the runner, of keeping the paint from running over the sides of the stone, and setting between the stone and the curb surrounding it, where it soon makes a hard bed which produces great friction, as set forth.

Second, in combining with a paint trough rotating with the runner, a fixed scraper, o, and guards, q and r, to cause the paint to flow over and out of said trough and be guided into any suitable receptacle, whilst the mill continues to run substantially as described.

[This invention has been patented in several foreign countries.]

DESIGNS.

STOVES—S. W. Gibbs, of Albany, N. Y. (assignor to North, Chase and North, of Philadelphia.) Two designs.

NOTE—One-third of all the patents granted as above were obtained through the "Scientific American Patent Agency." Long experience in the preparation of these important documents, and a thorough knowledge of the requirements of the patent laws, have given us a success in securing the rights of inventors, which is as gratifying to those who confide their interests to our care as it is pleasing to ourselves.

To those who have never done business through our office, or who have but recently become inventors, we would state that we are at all times ready to advise them, free of charge as to the novelty and patentability of their discoveries. Address MUNN & Co., Scientific American Office, New York.

Notes of Foreign Scientific Matters.

MANUFACTURE OF BANK NOTES—At a recent meeting of the Society of Arts, in London, Alfred Smee, F. R. S, and chemist of the Bank of England, read a paper and unfolded publicly the improved method employed by that great Institution for manufacturing its bank notes, to prevent forgery by the substitution of surface printing on the notes, for line printing.

The notes and checks of the Bank of England have, up to the present time, been invariably printed from copper and steel plates, in which the lines were engraved, or cut into the metal, and into these lines was introduced the ink, which in the progress of printing was transferred from the plate to the paper. In surface printing the reverse of this state of things occurs, as the design, instead of being cut into the metallic plate, is raised in relief, and the ink being applied to the raised portions by means of rollers, is transferred by the press to the paper in order to produce the impression. A single cut with a graving tool forms the groove which holds the ink in plate printing, while for surface printing a line must be cut on both sides, and equally finished on both, thus materially increasing the difficulty of engraving. From a steel die electro molds were obtained, and electro copper produced by this system is found to have hardly any limit to its durability. The limit to the duration of the electro casts, for the purposes of bank notes, has yet to be ascertained, as almost a million copies have been already printed from one without any sensible effect.

The platinized silver voltaic battery is the one used by the bank as a source of power, and its successful operation was exhibited to the meeting. It was devised by Mr. Smee, who received for it a gold medal from the society, and it has stood for 14 years the test of experience. At the bank large batteries are employed, holding several gallons of the acid charge, the platinized silver plate being of fair thickness, and the thick rolled zinc plates being so arranged that they can be easily changed. For charging the battery dilute sulphuric acid is used, generally mixed in the proportion of one-eighth acid to seven-eighths of water. In order to secure a strength suitable to the purposes of the battery, it is convenient to adjust the mixture to a specific gravity of 1130, and a battery so charged will continue in action nearly three weeks before it will be completely exhausted. It is found, however, in practice, that after having done efficient duty for from 7 to 14 days it becomes feeble, and requires a fresh supply to resuscitate its former vigor. An hygrometer is generally used to ascertain the changes, but Mr. Smee described an instrument constructed by himself for the purpose, which he termed a battery-meter. The point corresponding to specific gravity 1130 is called unity, the interval between that and 1160 the density of the exhausted battery is divided into 144 parts, by which division every degree represents 1 grain of zinc dissolved in 1000 grains of bulk of fluid. The opposite side of the scale between the same points is divided into 60 parts, each of which is for every grain of bulk in the fluid, about 1-1000ths of an inch in thicknes, for every superficial inch of surface upon which the copper is reduced in the precipitating trough. In this division a little allowance has been made for some local action of the zinc, and by this instrument the quantity of that metal which has entered into combination with the oxygen of the water in which it is subsequently dissolved, is really weighed. In the application of the battery-meter we have an illustration of a law which governs all physical phenomena, that without a change of matter we cannot have any physical force ; for in the electro-metallurgic apparatus we have an effect equal to the original change of matter within a trifling per centage. Thus, by the use of the battery-meter, this great law is popularized, furnishing a remarkable illustration of the reference of effect to cause. To contain the battery with its charge the best salt glazed stone-ware is employed, although no form of earthen-ware has been yet found permanently to resist the attacks of the metallic saline solution, but, being less brittle, it is still preferable to glass.

The best standard salt for the reduction of copper by electro-metallurgy has been hitherto the sulphate, and, with the occasional exception of the nitrate, is invariably employed. On procuring suitable originals, with proper means of duplication, the next process is to obtain perfect models, gutta percha blackleaded is generally employed. When perfection is desired, electro molds, and electro molds alone, are relied on, for which purpose the original is placed in the depositing trough, and a thick electro mold deposited. The casts are generally deposited so thick in the compound trough that they can be turned down to the required form and size, and all depositions in electro molds require for the highest perfection the utmost care, and the casts when ready for printing are mounted on solid brass blocks.

MACHINE TO RECORD THE BEATINGS OF THE PULSE—Prof. Bierordt has been exhibiting a machine at Frankfort, (Germany) to record on paper the beatings of the pulse. The arm of the patient is placed in a longitudinal cradle, and screwed down sufficiently to keep it steady. A small erection on one side holds a sort of lever worked on a hinge, at the end of which a pencil is inserted, the point of which has been dipped in Indian ink. This goes into a cylinder upon which paper has been stretched. The lever rests upon the pulse, and at every moment records the action upon the paper. If the pulse is steady a regular zig-zag line is drawn on the paper, but in cases where the pulse is rapid and jerking, the line goes up and down, making long and uneven marks.

WILL SALTPETER AND SULPHUR EXPLODE—H. L Patterson, an English chemist, says, I melted nitrate of soda, and, when perfectly fluid and red hot, I had poured into it melted brimstone, and there was produced certainly intense heat, but no explosion. I have also introduced into melted nitrate of soda, when red hot, guano, melted zinc, and cold tar, and there had been no explosion. There merely took place what chemists call deflagration, or combustion with sparks, without explosion. We want another element, and that element is water, for we have abundant evidence that when water comes in contact with intensely heated and saline matter violent explosion takes place."

Remedy for the Ship Worm.

James Jarvis, Inspector of ship timber at the Norfolk Navy Yard has discovered, that zinc paint prevents the ravages of the *toredo* on ships' bottoms.

TO CORRESPONDENTS.

R. C., of Ohio—Your brick molding is old.

R. C. T., of Texas—You wish to know if glass from ⅛ to ¼ an inch thick will adhere to wrought or cast iron? Yes, if you take means to make it stick.

J. H. G., of Ky.—We are of opinion that your smut machine is new, and that a patent can be had; your "motion" arrangement is old.

A. McD., of Mich.—Your plan for a fire engine is not new; we have applied for patents for more than one which embraced the same outward plan, with differing internal parts. Your car brake is good but very old; your plan for propulsion is also ancient: it has been found to work in practice, but not very well. Try your hand again.

J. F., of Mich.—We see nothing patentable in your post-office arrangement.

H. M., of Pa.—We must decline your very liberal offer; probably by advertising you can find a partner: our opinion of your book holder remains the same.

J. M. W., of Mich.—We think your churn is patentable. Certainly, will do the best we can for you: send on model, and $55, which will cover all.

H. S. N., of N. Y.—$5 received; all right; much obliged.

L. L. C., of New York—We do not know of any other kind of snow plow being used than the common one on railroads, to which you have referred; we cannot tell how yours will work, from your description.

S. S. R., of Texas—You can procure good wire fencing of the Lowell Wire Fence Company, Lowell, Mass.

G. P. F., of Mich.—The model you speak of is not in our possession—we did not preserve it.

J. A. R., of Mass.—The apparatus which you describe for cutting down trees appears to be a novel device, and we should think a patent could be obtained for it. There is no objection to your using the invention for opening and closing shutters.

J. H. O., of N. H.—A supplementary or third rail on a railroad for the purpose of preventing accidents, is not new; in Vol. 7 we published Carpenter's plan which embraces the same device.

A. G. E., of Ohio—We cannot say whether your machine for sticking sash and blinds will infringe others or not; you must examine others and ascertain the extent of their patent claims.

A. L., of Pa.—Your alleged improvement for increasing adhesion in ascending grades and inclines upon railroads, does not, in our opinion, contain any patentable novelty, supplementary wheels having grooved treads to suit a corresponding rail, were among the earliest improvements for that purpose, and since that time many similar devices have been invented.

G. K. W., of R. I.—We could not find anything new in your extension table.

A. W. F., of Pa.—Your machine for dressing follies, appears to be a good one, and we think it is decidedly a novel affair.

A. T. N., of Ky.—As yet there has been no practical machine put into operation for feeding paper to printing presses; if you have one capable of doing it to perfection, it is useful and valuable; send us a sketch and suitable description of it, and we will report our opinion upon it.

T. W., of C. W.—If you will send us a sketch and description of your improved saw set, we will examine it; you do not describe its operation, therefore we are unable to give an opinion in regard to it.

R. F., of N. Y.—Your improvement in wagon hubs we think is new, and we advise you to send us a suitable model of it. The patent fee is $30.

D. C. G., of Mich.—You can procure portable saw mills of H. Wells & Co., Florence, Mass. Price not known.

Benj. Walker, of Detroit, Mich., wishes to know if there is to be a National Convention of Railroad Engineers.

P. H., of N. Y.—In No. 9, Vol. 7, of the SCI. AM. you will find a description of Dr. Page's Electro-Magnetic Engine; this is the most promising invention of the kind that we are acquainted with.

D. M. B., of Ky.—We cannot tell where you can procure machines for making ointment boxes. A machine for keeping flies away from dining tables has been invented, operating in the manner described by you; a device of this kind was patented over twenty years ago.

H. W. B., of Pa.—We would advise you to delay your patent operations until you are better able to carry them forward, or enlist some of your acquaintances in them who can supply the requisite means.

L. P., of Pa.—We believe Moore & Hascall's machine is the one to which you refer; turn to the "History of Reaping Machines." You say there is in this paper, Feb. 3d, an article entitled "Not to Ridicule or Despise New Things," and accuse us of inconsistency by charging on to the "Spiritual Machine," in the same paper. Upon what page in that paper do you find the article? we look in vain for it there: we acknowledge our inconsistency in noticing the "Spiritual Machine,"—it is inconsistent with common sense to do so, and is useful time thrown away.

A. H., of Va.—We do not know where "Scott's Little Giant Mill" can be procured; we never heard of it; as it is named after Senator Douglas, possibly a line addressed to him at Washington would bring out the necessary information; the Senator ought to keep the run of his namesakes.

J. C. H., of N. Y.—Your apparatus for tipping a sleepy fellow out of bed in the morning is a decided novelty, and ought to be very generally employed for that purpose; it is better than to tip a dish of water into the countenance of the sleeper.

J. S. D., of Ala.—We do not know anything about the lamp to which you refer, nor about the soap.

T. F., of N. H.—We are much obliged to you for the information sent.

A. Z., of——Yours has been received.

U. L. C. Jr., of Texas—The Minie bullet would have an advantage in the common rifle. It is conical, with a conical hollow chamber behind, into which is fitted a small iron capsule, that is driven in, and spreads the lead in the grooves of the rifle.

W. H, of Vt.—We do not believe that water can be elevated above thirty-two feet by atmospheric pressure. Be careful and not overlook any point. We have all to learn much, and the more knowledge we obtain, we feel the more consciousness of our ignorance.

J. J. H., of Ky.—Read's Treatise on Watchmaking is to be found at Blackie & Son's, 117 Fulton st. The price is $5. We are not acquainted with any work devoted exclusively to the making of sun-dials.

W. D. Jr., of Pa.—We have examined the sketch of your atmospheric omnibus, and although we cannot but regard it as a novelty, still we have not sufficient confidence in its success to warrant us in encouraging you to spend money upon it.

M. R. S., of Ind.—We think it very probable that a patent can be secured on the elastic jar cover. You had better send us a specimen for examination.

J. T., of N. C.—Hard cast iron can be softened by heating it to redness and keeping it so for a considerable time, then covering it up and allowing it to cool very slowly.

F. M. S., of Ohio—If you would smear the trunks of your fruit trees with tar, the rabbits would not trouble them, so we have been informed.

J. W. C., of Ind—The principle of using the same steam in two rotary engines on one shaft is not new; we believe you could not obtain a patent.

H. A. L., of N. J—A patent granted to two inventors is just as valid as if granted to only one, why not It is absurd to suppose otherwise, and your informant to the contrary is manifestly not capable of giving advice upon the subject. A deed of transfer of any special portion of the territory covered by the patent, would require the signatures of both parties, but either party could sell his undivided portion on his own account.

M. Mc G., of Mich.—We should judge from the description given of your railroad car brake, that it possesses novelty of a patentable character, and would advise you to send us a suitable sketch described by letters of reference, so as to enable us to understand it more fully.

H. O., of Ind.—We do not think there is the slightest chance for a patent on your alleged improvement in washing machines. Machines made in the same manner are very well known.

C. F., of Tenn.—We do not know anything about a stove called the "Iron Witch." If you can supply us with the patentees name, we can give you the information you need in regard to date, &c.

J. J. M., of Ohio—We do not think your machine for cutting wooden screws on bedsteads infringes on any patented machine for the purpose. It is, we think, a good device, and we think a patent may be secured for it.

J. B. T., of Pa.—We advise you to send us a sketch and description of your ox-cart, that we may get a more clear and perfect understanding of it. Judging from the description, we cannot find anything new in it upon which a claim can be made, but we can decide this point much better by the aid of a sketch.

C. W. G., of Ct.—The model of your alleged improvement in self-acting carriage brakes has been examined. The arrangement is different from any other that we have ever seen for the purpose. Still we question the propriety of making an application for a patent. You had better examine, if you can, the brake illustrated in No. 41, Vol. 4, SCI. AM.

J. R. A., of N. Y.—The sketch of your straw cutter has been carefully considered. It is not uncommon with us to receive sketches of cutters constructed in the same manner. In Rees' Encyclopedia is illustrated a machine essentially the same in all its characteristics.

H. N., of N. J.—We would like a specimen of your elastic gloves for examination, and then we can pass an opinion upon them.

Money received on account of Patent Office business for the week ending Saturday, Feb. 24:—

D. Mc A., of Ct., $30; H. & H., of N. Y., $200; E. R. G., of L. I., $30; H. & M., of N. Y., $30; B. B., & Mc L., of N. Y., $25; C. W. P., of N. J., $20; S. H. H., of R. I., $25; C. J. F., of O., $30; E. D. C., of Ct., $55; J. G. L., of Iowa, $25; C. W. C., of Mass., $25; J. G., of N. Y., $30; W. & G., of N. Y., $25; J. H. M., of N. Y., $30; H. T., of O., $35; C. H. W., of C. W., $25; A. A., of N. Y., $27; G. T., of O., $35; C. H. P., of N. Y., $20; R. W., of Ct., $70; H. B. L., of O., $30; D. S. H., of R. I., $30; A. L., of Pa., $30; E. T. R., of Ind., $30; J. C. B., of O., $35; J. A. W., of Mass., $25; J. C. B., of Ct., $30; J. W. D., of N. Y. $25; G. & G. of L. I., $25; D. W., of N. J., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 24:

R. W., of Ct., 3 cases; S. H. H., of R. I.; J. W. P., of Va.; B. B., & Mc L., of N. Y.; C. W. C., of Mass.; M. S., of N. Y.; W. & G., of N. Y.; J. W. D., of N. Y.; G & G., of L. I.; J. G. L., of Iowa; A. A., of N. Y.; D. W., of N. J.; F. J. B., of N. Y.; W. M., of N. Y.

Important Items.

MODELS—We are receiving almost daily, models of inventions which have not the names of their inventors marked upon them. This usually prevents us from taking any notice of them whatever. We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and sometimes prevent the model from being mislaid.

BACK NUMBERS AND VOLUMES—We have the following numbers and volumes of the SCIENTIFIC AMERICAN, which we can supply at the annexed prices:—Of Volume 5, forty numbers; price in sheets, $1; bound, $1,75. Of Volume 6, all; price in sheets, $2; bound, $2,75. Of Volume 7, all; price in sheets, $2; bound, $2,75. Of Volume 8, none complete, but about 30 numbers in sheets, which will be sold at 50 cents per set. Of Volume 9, complete in sheets, $2; bound, $2,75.

☞ We are able to furnish all the back numbers of the present volume of the SCIENTIFIC AMERICAN, and to new subscribers we shall continue to send the back numbers as long as we have them, so as to render their volumes complete.

PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office, stating the name of the patentee, and enclosing $1 for fees for copying.

RECEIPTS—When money is paid at the office for subscriptions a receipt for it will always be given, but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgement of the receipt of their funds.

Science and Art.

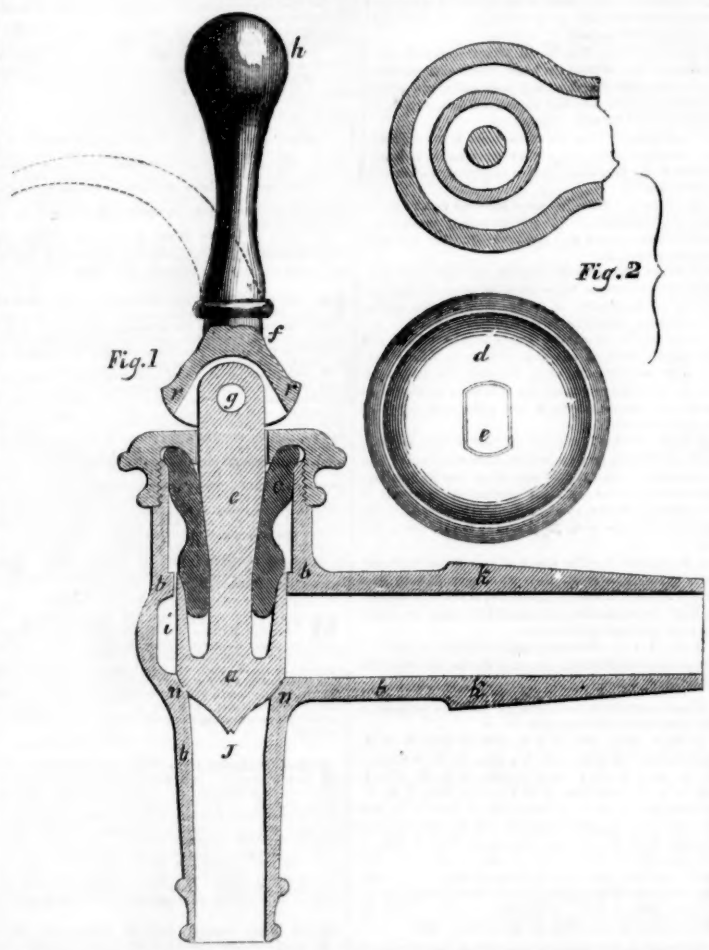
History of Reaping Machines.—No. 21.

On the 6th of January, 1852, a patent was granted to Mahlon Garretson, of Bermuda, Pa., for a clover harvester, embracing the shear-cutting feature for severing the heads of clover, (see claim, page 142, Vol. 7, Sci. Am.) On the 20th of the same month, a patent was granted to Thomas Van Fossen, of Lancaster, Ohio, having two claims—one for teeth on the reel, the other for a sliding platform to arrest and relieve the grain alternately in combination with the reel, to keep the grain straight and constantly moving, (see claim, page 158, Vol. 7, Sci. Am.) On the 10th of February following, a patent was granted to Byron Densmore, of Sweden, N. Y., embracing four claims, three for operating the rake, and one for the manner of supporting the cutter blade, (see claim on page 182, Vol. 7, Sci. Am.) On the same date a patent was granted to Wm. F. Ketchum, of Buffalo, N. Y., embracing two claims, published on same page; the patent was assigned to Rufus S. Howard, of the same place. The nature of the improvements consisted, first, in projecting a stout bar from the frame parallel with, but behind and above the rack at a sufficient hight to clear the grass, and having slim iron braces extending down from it to the rack in a line with the course of the machine, so as not to clog, while they sustain the rack; second, in connecting a shield or sheet iron plate, with the shoe in the frame in the front part of the machine. The object of this plate is to pass over the short stubble or loose grain, and tread it down when the end of the cutter bar is working, to prevent such grass or stubble being caught in the moving joint, and clog the machine. This patent was re-issued on the 28th of Feb. last year; on the 17th February a patent was granted to R. T. Osgood, of Orland, Me., for applying a toggle joint upon the end of the cutting arm, (see claim on page 190, Vol. 7, Sci. Am.)

On the 8th of June following a patent was granted to Geo. H. Rugg, of South Ottawa, Ill., for an improvement in harvesters, embracing the feature represented in the annexed figure (47,) which exhibits a side elevation of a finger, and cutter. The nature of the invention consists in the peculiar shape and arrangement of the fingers which are set over the sickle, and by which the sickle, with the aid of the rivet, is prevented from being clogged;" O are the fingers; N is the sickle; the sickle is attached by rivets, *n*, to a metal strip, P, which is attached to the vibrating levers. The rivets, *n*, pass through the sickle and project a short distance below it; all the fingers, O, are driven into the front cross piece of the frame, and each has a semicircular curve, *o*; this curve, extending to all the fingers, is to allow the rivets to work clear, and by this means prevent the sickle from being clogged, as the rivets will draw out all the grass or straw that may happen to catch between the sickle and fingers, (see claim on page 318, Vol. 7, Sci. Am.)

On the 15th of the same month, William and Thomas Schebly, of this city (formerly of Hagerstown, Md., we believe, and who had early devoted their attention to reaping machines,) obtained a patent for an improvement in embracing an arrangement of bridges beneath the platform in combination with chain bands, having accommodating knee-formed fingers or rakes, working on pivots and attached thereto; also working the cutter between an under and an uppor open guard or finger, (see claim on page 326 Vol. 7, Sci. Am.) On the 20th of July succeeding a patent was granted to E. B. Forbush, of New York, embracing four claims relating to a guard finger with an inside surface to cut against; the regulation of this finger; and a pivoted motion given to the rake, so that a person can remove the grain from the platform in bundles, and sit or stand on the machine near the driving wheel. On the same date a patent was granted to J. S. and David Lake, of Smith's Landing, N. J., for coupling the wheel to the shaft with a universal joint, and toggle joint arms, to admit of a vertical motion, and with a gimble ring to allow of a wabbling motion. On the same date a patent was granted to Wm. Manning, of South Trenton, N. J., for suspending the cutting head and front part of the machine, to dispense with front wheels, (see claims of these patents on page 366, Vol. 7, Sci. Am.) On the 10th of August, same year, Daniel Fitzgerald and D. Smith, of this city, obtained a patent, having three claims, embracing a floor in the center of the machine for the gatherer to stand on, a rim to which the knives are attached, and a spiral channel within the guard fingers, for gathering the grain, when cut, into the central space or platform;" (see claims on page 390, Vol. 7, Sci. Am.)

SELF-CLOSING STOP COCK.



The accompanying engravings represent an improvement in self-closing stop cocks, for which a patent was granted to David N. B. Coffin, Jr., of Lynn, or 292 Washington street, Boston, Mass., on the 9th of January last.

Figure 1 is a vertical longitudinal section of the cock, and fig. 2 is a horizontal section of the cock, *d* being the gland, and *e* the valve stem.

The cock represented does not differ materially in its external form and proportions from ordinary cocks, it having a chamber to contain the valve and its seat, which chamber communicates by the shank of the cock with the cistern or other source of supply of the liquid to be drawn off, and the discharge tube with the open air, or a receptacle into which the liquid is to be discharged.

The valve seat, *n*, and valve, *a*, are for the purpose of opening and closing the communication between these tubes through the chamber, *i*, so as to establish a current of the liquid through the cock from the source of supply, and to cut off the same at will.

The valve chamber is cylindrical and has its upper end closed by a screw gland, which serves the purposes of guiding the valve stem, permitting the same to protrude through the side of the cock, and of compressing an elastic packing of india rubber or other suitable material tightly around the valve stem, and against the sides of the chamber, to prevent leakage and also to support the packing against the valve, in order to press the same constantly towards its seat.

The valve, *a*, in this figure, is cylindrical, and is fitted into the chamber so as to slide freely towards and from its seat, *n*. The stem, *e*, of the valve extends through the gland, and is surrounded or packed by an annular piece of vulcanized india rubber, *c*. This packing also presses upon the valve with sufficient force to cause it to close promptly, and to hold it closed. Whenever the valve is opened the spring will be forcibly compressed, and will tend to return the valve to its seat.

The upper extremity of the valve stem is jointed to the central part of a disk, cap, or foot, whose edges, *r*, project considerably beyond the sides of the stem, and rest upon the top of the gland; from the upper side of this foot, *f*, a handle, *h*, projects upward and stands erect when the valve is closed. By inclining this lever any way in which the joint will allow it to turn, the valve will be raised. Whenever the hand of the operator is removed from the handle, *h*, the cock will close of itself.

The resistance to the act of opening, being a steady spring force, it obviates the liability to open too far. The surfaces of the valve and its seat, which fit together to close the cock, being small and spherical in shape, are less difficult to be fitted, and as these form the only close fit required, and there being no tendency to grind, as in the taper plug cock, it is not likely to leak, and is easy to be kept in repair. When it is required to keep a reservoir or cistern filled to a certain point, it is only necessary to elongate and curve the lever, as shown by the dotted lines in the figure, when a float of a given weight attached to its end by a cord, will operate the valve safely without the least attention, the cord being first adjusted to the proper length. The elastic packing, together with the space around the same, serves, to some extent, the purpose of an air chamber to relieve the strain when the valve is closed too suddenly; as the chamber, *i*, extends all around the valve, *a*, it, the valve, needs to be raised but little to fill the nozzle.

The patent embraces two claims, one for the handle, being turnable either way; also the arrangement of the elastic packing to perform two duties, viz., packing the valve and pressing it down on its seat, making it self-closing when pressure of the hand is removed. Other modifications of this cock from that represented, may be employed, embracing the same main principles, which are excellent.

More information may be obtained by letter addressed to Mr. Coffin at either of the above-named places.

Slate Quarry in Virginia.

A quarry of green and purple slate has been opened in Albermarle county, Va. It is said that several Welsh quarriers give it as their decided belief that this slate is the purest they have ever seen in America, and only equalled by the slate obtained from the old quarry in North Wales.

We have entertained the opinion that Vermont slate is equal if not superior to the Welsh slate.

Our Inland Commerce.

The estimated value of commerce carried on in western steamboats amounts to $330,000,000. What an inland commerce! There are 800 steamboats on the western lakes and rivers, averaging 200,000 tuns.

LITERARY NOTICES.

The Edinburgh Review—The first No. of a new volume of this world-wid. famous Review, is just issued by its enterprising American publishers, Messrs. Leonard Scott & Co., No. 54 Gold street, this city: it contains articles on "Parliamentary Opposition," "Cardinal Mezzofanti," "Charles the Fifth," the "Siege of Rhodes, 1480," with a map, "Mount Athos and its Monasteries," "Marsden's History of the Puritan's," and "The War in the Crimea." This Review is the consistent advocate of rational reform when reform is required, and conservatism, when radicalism would be dangerous; it is always candid, and dignified, and generous. This is an excellent time to subscribe for any person who desires impartial and sound information respecting British politics and literature.

Hall's Journal of Health, for February contains very sensible articles upon the "Throat-Ail," "Functions of the Skin," "The Bible and Materia Medica," "How People Take Cold," and others of much interest to suffering and dying humanity; the cry is, "Oh for a long life," but "that life is longest which best answers life great end." Dr. Hall's suggestions to this great end are eminently practical, and if regarded would yield their promised harvest. The *Journal* is published monthly at No. 41 Irving Place, at $1 per annum.